ENVIRONMENTAL Fact Sheet

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

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Recycling Glass

Glass in Solid Waste

Weight and Volume -- In 1995, 12.9 million tons of glass were discarded in the U.S.-- about 6.2 percent by weight of municipal solid waste (MSW), and a somewhat smaller percentage of MSW volume. Containers account for 90 percent of all glass in MSW; durable goods (e.g., appliances) account for most of the remaining 10 percent. Nationally, over 80 percent of all glass discards are derived from residential sources, and less than 20 percent from commercial and industrial establishments. Locally, however, the proportion of commercially derived glass can be much higher. For example, New Hampshire's hospitality industry and recreational areas are the source of large quantities of discarded glass.

Of the 41 billion glass containers manufactured annually in the U.S., about 33 percent are food containers, 31 percent are beer bottles, 9 percent are wine and liquor bottles, and 22 percent are bottles for other beverages. The remaining 5 percent are containers for cosmetics, pharmaceuticals, and other materials. By color, over 65 percent of U.S.-produced bottles are clear ("flint" in industry terminology), 25 percent are brown ("amber"), and less than 10 percent are shades of green or (very rarely) blue. It is estimated that 2-4 billion containers (primarily beer, wine, and liquor bottles) are imported into the U.S. each year. More than half of imported bottles are green.

Disposal -- Glass is chemically and biologically inert, and remains intact in landfills for thousands of years. Even when glass is completely crushed, its chemical nature remains unaltered. Glass melts upon incineration, and is captured for disposal in incinerator bottom ash. Undecorated glass does not contain toxic or hazardous constituents that pose concerns upon landfilling or incineration.

Glass Recycling

Collection, Processing, and Storage -- The U.S. Environmental Protection Agency estimates that about 27.2 percent of glass containers are recycled nationwide. Over 96 percent of New Hampshire's residents have access to glass recycling through curbside or dropoff programs. Glass collected to be manufactured into new containers must be managed carefully, because purchasers' quality specifications are very tight. A tiny proportion of contaminants -- as little as one ceramic mug in a 20-ton container -- can disqualify an entire load from recycling markets. Serious contaminants include non-container glass (e.g., windows, drinking glasses, light bulbs), mixed color glass, ceramics, and metals. Automated systems to classify glass by color or chemical characteristics do not exist, with the result that glass destined for container markets

must be manually color-separated and checked for contaminants -- a labor-intensive and expensive process.

On the other hand, because it is chemically inert, glass can be stored outdoors for long periods before it is marketed. Most municipal recycling programs store glass in outdoor bunkers (typically, three-walled concrete bins) until they have sufficient volumes to ship. Because of long transport distances and relatively low prices, glass must be shipped in large quantities, normally 20 tons or more. In most cases, bottles cannot be crushed prior to shipping (except for incidental breakage), because of processors' concerns that they could not identify contaminants in crushed loads.

Manufacturing -- Glass reused to manufacture new containers yields the highest value. Recycled crushed glass (or "cullet") can be melted directly in the furnaces in which container glass is produced, with large savings in energy compared to production from unprocessed raw materials. For this reason, all container manufacturers actively seek out sources of recycled cullet.

In addition to new containers, recycled glass can be used in many other products. Recycled containers can be used to manufacture fiberglass, glass wool insulation, and similar products; color separation is not critical for such applications. Finely ground glass can be used as an abrasive, or in filter media, reflectors, and reflective paints. Glass has been used as an aggregate in asphalt paving mixes ("glassphalt"), mixed-color and contaminated glass can be used as aggregate in gravel mixes for construction applications (e.g., highway and sidewalk subgrades, storm drains).

Markets for Recycled Glass -- Approximately 75 furnaces provide the major market for recycled container glass in the U.S. For clear and brown glass, this market has been fairly stable for the past several years. Markets for green glass are weak, however. Over half of the green containers used in the U.S. are imported, so domestic furnace demand for recycled green glass is not strong. Developing new markets for green glass is a regional and national concern. Non-container markets for green and other glass also remain relatively undeveloped.

New technologies may have a major impact on recycled glass markets in coming years. Among these are techniques that will allow the increased use of mixed color cullet in existing glass furnaces, and technologies that may allow clear glass bottles to be coated with dyes in a rainbow of colors -- the coatings will burn off in a glass furnace, allowing containers of all colors to be recycled together.

New Hampshire faces a number of specific market challenges for recycled glass. For example, the state has no end-use glass markets (furnaces or other manufacturers), and the cost of long-distance transport to markets can be prohibitive. Finding alternative markets for recycled glass is a high priority for the state's recyclers. The State's Department of Transportation was the first in the nation to adopt a specification allowing the use of crushed glass as an aggregate in state highway projects, and has actively sought to procure glass for this use. Many New Hampshire communities are also pursuing this and other options to find local uses for recycled glass.

For More Information -- Additional information on recycling glass and other materials in New Hampshire is available from: Recycling Coordinator, NH Department of Environmental Services, Waste Management Division, 29 Hazen Drive, Concord, NH 03301; Telephone: 603-271-2900; TDD Access: Relay NH 1-800-735-2964.